

AMENDMENTS TO THE CLAIMS:

1. (Original) A transmission type liquid crystal display device comprising: gate lines; source lines; and switching elements each arranged near a crossing of a gate line and a source line, a gate electrode of a switching element being connected to the gate line, a source electrode of the switching element connected to the source line, and a drain electrode of the switching element connected to a pixel electrode for applying a voltage to a liquid crystal layer, wherein a transparent colorless interlayer organic insulating film, formed from a cured organic polymer and having a thickness determined by a light transmittance and a dielectric constant of the film, is provided above the switching element, the gate line, and the source line, said thickness of the transparent colorless interlayer organic insulating film provides a reduced capacitance between said pixel electrode and said gate line or source line, and

said pixel electrode is a transparent conductive film on the interlayer insulating film,

wherein a spectral transmittance of the transparent interlayer organic insulating film has a lower transmittance for blue light than that for green and red light.

2. (Original) A transmission type liquid crystal display device according to claim 1, wherein the thickness of the transparent interlayer organic insulating film is 1.5 μm or more.

3. (Original) A transmission type liquid crystal display device according to claim 1, wherein the transparent interlayer organic insulating film is a photosensitive resin.

4. (Original) A transmission type liquid crystal display device according to claim 3, wherein the transparent interlayer organic insulating film is a photosensitive acrylic resin.

5. (Original) A transmission type liquid crystal display device according to claim 3, wherein the transparent photosensitive interlayer organic insulating film is a decolored resin.

6. (Original) A transmission type liquid crystal display device according to claim 3, wherein the photosensitive resin is a positive type photosensitive resin.

7. (Original) A transmission type liquid crystal display device according to claim 3, wherein the photosensitive resin has a reactive peak at a wavelength of 365 nm.

8. (Original) A transmission type liquid crystal display device according to claim 3, wherein the photosensitive resin has a plurality of reactive peak at wavelength of 365 nm, 405 nm or 436 nm.

9. (Original) A transmission type liquid crystal display device according to claim 8, wherein the photosensitive resin is an acrylic resin that includes a copolymer having methacrylic acid and glycidyl methacrylate, and a naphthoquinone diazide positive-type photosensitive agent.

10. (Original) A transmission type liquid crystal display device according to claim 9, wherein the transparent interlayer organic insulating film is curved.

11. (Original) A transmission type liquid crystal display device according to claim 1, wherein the interlayer organic insulating film includes a photosensitive acrylic resin including a copolymer having methacrylic acid and glycidyl methacrylate.

12. (Original) A transmission type liquid crystal display device according to claim 1, wherein the transparent interlayer organic insulating film suppresses degradation by resist removing solution used to form the pixel electrode.

13. (Original) A transmission type liquid crystal display device according to claim 1, wherein the transparent interlayer organic insulating film has a light transmittance of 90% or more for light within an entire wavelength range of about 400 nm to about 800 nm.

14. (Original) A transmissive liquid crystal display device comprising:
gate lines; source lines; and switching elements each arranged near a crossing of a gate line and a source line, a gate electrode of a switching element being connected to the gate line, a source electrode of the switching element connected to the source line, and a drain electrode of the switching element connected to a pixel electrode for applying a voltage to a liquid crystal layer;

wherein said pixel electrode is a transparent conductive film on a transparent colorless interlayer insulating film;

the transparent colorless interlayer organic insulating film, formed from a cured organic polymer, is above the switching element, the gate line, and the source line, the organic insulating film has a thickness determined by a light transmittance and a dielectric constant of the film, and

wherein a spectral transmittance of the transparent colorless interlayer organic insulating film has a lower transmittance for blue light than that for green and red light and the interlayer organic insulating film has a photosensitivity.

15. (Original) A transmission type liquid crystal display device according to claim 14, wherein the thickness of the transparent interlayer organic insulating film is 1.5 μm or more.

16. (Original) A transmission type liquid crystal display device according to claim 14, wherein the transparent interlayer organic insulating film is a photosensitive acrylic resin.

17. (Original) A transmission type liquid crystal display device according to claim 16, wherein the photosensitive acrylic resin is a positive type photosensitive resin.

18. (Original) A transmission type liquid crystal display device according to claim 16, wherein the photosensitive acrylic resin has a reactive peak at a wavelength of 365 nm.

19. (Original) A transmission type liquid crystal display device according to claim 16, wherein the photosensitive acrylic resin has a plurality of reactive peak at wavelength of 365 nm, 405 nm or 46 nm.

20. (Original) A transmission type liquid crystal display device according to claim 16, wherein the photosensitive acrylic resin includes a copolymer having a methacrylic acid and glycidyl methacrylate, and a naphthoquinone diazide positive-type photosensitive agent.

21. (Original) A transmission type liquid crystal display device according to claim 14, wherein the transparent photosensitive interlayer organic insulating film is a decolored resin.

22. (Original) A transmission type liquid crystal display device according to claim 14, wherein the interlayer organic insulating film includes a photosensitive acrylic resin including a copolymer having a methacrylic acid and glycidyl methacrylate.

23. (Original) A transmission type liquid crystal display device according to claim 14, wherein the transparent interlayer organic insulating film suppresses degradation by resist removing solution used to form the pixel electrode.

24. (Original) A transmission type liquid crystal display device according to claim 14, wherein the transparent interlayer organic insulating film has a light transmittance of 90% or more for light within an entire wavelength range of about 400 nm to about 800 nm.

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34. A liquid crystal display device comprising:

a substrate;

an array of transistors on said substrate;

a plurality of gate and data lines connected to said transistors;
an array of pixel electrodes on said substrate;
a plurality of pixel electrodes overlapping at least one of the gate and data lines;
and

a photosensitive resin on said substrate between said gate and data lines and
said pixel electrodes at least in the areas of overlap and areas adjacent pixel electrode-
connected electrodes of the transistors, wherein said photosensitive resin has a
dielectric constant of about 3.4-3.5, and a first group of contact vias defined therein by
photo-imaging,

wherein said pixel electrodes are in electrical communication with corresponding
transistor electrodes through corresponding contact vias of said first group that are
defined in said photosensitive resin.

35. The liquid crystal display device according to claim 34, wherein the
photosensitive resin is planarized adjacent the pixel electrode.

36. The liquid crystal display device according to claim 34, wherein a pixel
aperture ratio is at least about 65%.

37. The liquid crystal display device according to claim 34, wherein the pixel
electrode overlaps one of the data and gate lines by about 1 μm or more.

38. The liquid crystal display device according to claim 34, further comprising a
semiconductor layer on top of the gate insulating layer.

39. The liquid crystal display device according to claim 38, wherein the
semiconductor layer includes intrinsic a-Si.

40. The liquid crystal display device according to claim 38, further comprising a contact layer over the semiconductor layer.

41. The liquid crystal display device according to claim 40, wherein the contact layer includes amorphous silicon.

42. The liquid crystal display device according to claim 34, wherein the thickness of the pixel electrodes is no greater than 1500 Å.

43. A liquid crystal display device comprising:
a substrate;
an array of transistors on said substrate;
a plurality of gate and data lines connected to said transistors;
an array of pixel electrodes on said substrate;
a plurality of pixel electrodes overlapping at least one of the gate and data lines in areas of overlap; and
a photo-imageable insulating layer on said substrate between said gate and data lines and said pixel electrodes at least in the areas of overlap and in areas adjacent transistor electrodes which are in electrical communication with the pixel electrodes;
wherein said photo-imageable insulating layer has a dielectric constant in a range from about 3.4 to about 3.8, and a first group of contact vias defined therein by photo-imaging, wherein said pixel electrodes are in the electrical communication with corresponding transistor electrodes through corresponding contact vias of said first group that are defined in said insulating layer.

44. The liquid crystal display device according to claim 43, wherein the photo-imageable insulating layer is planarized adjacent the pixel electrode.

45. The liquid crystal display device according to claim 43, wherein a pixel aperture ratio is at least about 80%.

46. The liquid crystal display device according to claim 43, wherein the pixel electrode overlaps one of the data and gate lines by about 1.0 μm or more.

47. The liquid crystal display device according to claim 43, further comprising a semiconductor layer on top of the gate insulating layer.

48. The liquid crystal display device according to claim 47, wherein the semiconductor layer includes intrinsic a-Si.

49. The liquid crystal display device according to claim 47, further comprising a contact layer over the semiconductor layer.

50. The liquid crystal display device according to claim 49, wherein the contact layer includes amorphous silicon.

51. The liquid crystal display device according to claim 43, wherein the thickness of the pixel electrodes is no greater than 1500Å.

52. A method of forming a liquid crystal display device comprising:

(1) providing, on a substrate:

(a) an array of transistors;

(b) a plurality of gate and data lines connected to said transistors;

(2) providing a photo-imageable insulating layer on said substrate over said gate and data lines, said photo-imageable insulating layer having a dielectric constant in a range from about 3.4 to about 3.8;

(3) using photo-imaging of the photo-imageable insulating layer to define a first group of contact vias in the photo-imageable insulating layer;

(4) providing a plurality of pixel electrodes overlapping at least one of the gate and data lines in areas of overlap and in areas adjacent transistor electrodes which are in electrical communication with the pixel electrodes;

(5) providing electrical communication between said pixel electrodes and corresponding transistor electrodes through corresponding contact vias of said first group that are defined in said insulating layer; and

wherein the photo-imageable insulating layer is provided between said gate and data lines and the pixel electrodes at least in areas of overlap between said gate and data lines and said pixel electrodes.

53. The method according to claim 52, further comprising planarizing the photo-imageable insulating layer adjacent the pixel electrode.

54. The method according to claim 52, wherein a pixel aperture ratio is at least about 80%.

55. The method according to claim 52, wherein the pixel electrode overlaps one of the data and gate lines by about 1.0 μm or more.

56. The method according to claim 52, further comprising providing a semiconductor layer on top of the gate insulating layer.

57. The method according to claim 56, wherein the semiconductor layer includes intrinsic a-Si.

58. The method according to claim 56, further comprising providing a contact layer over the semiconductor layer.

59. The method according to claim 58, wherein the contact layer includes amorphous silicon.

60. The method according to claim 52, wherein the thickness of the pixel electrodes is no greater than 1500Å.

61. A transmission type liquid crystal display device according to claim 1, wherein the dielectric constant is in the range of 3.4-3.5.

62. A transmission type liquid crystal display device according to claim 1, wherein the dielectric constant is in the range of 3.4-3.8.

63. A transmission type liquid crystal display device according to claim 14, wherein the dielectric constant is in the range of 3.4-3.5.

64. A transmission type liquid crystal display device according to claim 14, wherein the dielectric constant is in the range of 3.4-3.8.